

Higher Education Common Core State Standards Digest: Introduction

This document serves as a brief guide to the design, organization, and substance of the Common Core State Standards in both ELA/Literacy and Mathematics. For more than two decades, states have crafted educational standards to define what students should know and be able to do upon graduating high school. Until now, however, our expectations of what makes a student prepared to graduate from high school have differed across states, regardless of the fact that students may attend the same college or enter the same workplace. As postsecondary educators know well, this fractured system has left some students more prepared than others for the demands of college and career.

With the Common Core State Standards, states can share a common goal of ensuring all students master the knowledge and skills most essential to college and career readiness.

Coordinated by the National Governor's Association and the Council of Chief State School Officers, the CCSS Initiative drew on the expertise of teachers, researchers, and content experts from across the country. By design, the Standards were informed by a large body of evidence, including scholarly research and international comparisons, and built on the most effective models of top-performing states and countries. The NGA and CCSSO received feedback on the draft standards from stakeholders including, but not limited to, leaders in business and postsecondary education. Following the integration of feedback from two public comment periods, forty-six states have adopted and are now implementing the CCSS.

The CCSS take seriously the need to connect K-12 education directly to the demands of higher education and the workplace. This presents both an opportunity as well as a responsibility to the higher education system to meaningfully relate college work to the expectations of students graduating high school. Relieved of the impossible challenge of synthesizing 50 sets of state standards, postsecondary educators and business leaders are now able to understand the specific foundational knowledge and skills all students are expected to gain in their K-12 careers. Students are able to experience the relevancy of their K-12 careers to their action in the world beyond graduation.

This document focuses on the major shifts required by the CCSS in ELA/Literacy and Math, with an emphasis on secondary education. Great care went into creating a succinct picture of the standards in this document; however, nothing replaces a close reading of the standards themselves, which are available at www.corestandards.org.

CCSS ELA Standards Digest

The Standards insist that instruction in reading, writing, speaking, listening, and language be a shared responsibility within the school. The grades 9–12 standards are divided into two sections, one for ELA and the other for literacy in history/social studies, science, and technical subjects. This division reflects the unique, time-honored place of ELA teachers in developing students' literacy skills, while at the same time recognizing that teachers in other areas must have a role in this development as well.

Part of the motivation behind the interdisciplinary approach to literacy promulgated by the Standards is extensive research establishing the need for college and career ready students to be proficient in reading complex informational text independently in a variety of content areas.

In ELA/Literacy, the Standards include the following key shifts in instruction:

Shift 1 - Complexity: *Regular practice with complex text and its academic language*

Underlying the Standards is research indicating that 1) what students can read, in terms of text complexity, is the greatest predictor of success in college and careers (ACT, 2006) and that 2) the current gap between the complexity of high school texts and college/career texts is roughly four grade levels (Williamson, 2006). Therefore, the first key shift the Standards require is that students must be exposed to appropriately complex texts in both instruction and assessment. This important shift finds explicit expression in Reading Standard 10, which includes a staircase of increasing text complexity that students can read independently and proficiently, from elementary through high school.

Shift 2 – Evidence: *Reading, writing, and speaking grounded in evidence from text, both literary and informational*

The second key shift required by the Standards is the prioritization of textual evidence across the domains of reading, writing, and speaking and listening, based on National Assessment of Educational Progress data and input from college faculty indicating that command of evidence is a key college- and career-ready skill. For reading, there is an enhanced focus on students' citing evidence from texts to support claims and/or inferences, as described in Reading Standard 1. For writing, as described in Writing Standard 9, the focus related to writing and analyzing sources is amplified and takes precedence over other types of writing. And for speaking and listening, the focus is on purposeful academic talk, as described in Speaking and Listening Standard 1.

Shift 3 – Knowledge: *Building knowledge through content-rich nonfiction*

The third key shift required by the Common Core is a focus not only on English Language Arts but also on literacy across the disciplines of science, social studies, and technical subjects. The Standards require certain percentages of literature and informational texts in instruction and assessment (modeled after NAEP Reading Framework):

- 50% informational and 50% literary at the elementary level
- 55% informational and 45% literary at the middle school level
- 70% informational and 30% literary at the high school level

This distribution should reflect the reading of students *across-the-curriculum* and not only what is read in ELA classrooms. Research indicates that informational text makes up the vast majority of the required reading in college and the workplace (Achieve, Inc. 2007), and that informational text is harder for most students to read than narrative text (Bowen & Roth, 1999; Bowen, Roth, & McGinn, 1999, 2002; Heller

& Greenleaf, 2007; Shanahan & Shanahan, 2008). Through an extended focus on literacy in their science, history, and technical classes, students build knowledge that enables them to be ready for college and careers. The Standards require the synthesis of ideas within and across texts; they call for regular short research projects in many different content areas. In addition, students' ability to understand academic vocabulary in context is essential for building knowledge.

The college and career readiness (CCR) anchor standards provide another source of focus and coherence. The same ten CCR anchor standards for Reading apply to both ELA and literacy applied in history/social studies, science, and technical subjects across the grades; they apply to both literary and informational texts. The ten CCR anchor standards for Writing cover numerous text types and the same subject areas. This means that students can develop mutually reinforcing skills and exhibit mastery of standards for reading and writing across a range of texts and classrooms.

In the charts below, using the original design of the CCSS themselves, like standards from ELA and from Literacy in History/Social Studies and Science and Technical Subjects are bundled under their corresponding anchor standard. While great care went into paraphrasing and shortening each Standard for ease of use in this digest, there is nothing like a close reading of the Standards themselves. The CCR anchor and the high school standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate by the time they graduate.

Digest of High School CCR Reading Demands

To become college and career ready, the standards ask students to grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts. Standards 1 and 10 play a special role since they operate whenever students are reading: Standard 1 outlines the command of evidence required to support any analysis of text (e.g., analyzing structure, ideas or the meaning of word as defined by Standards 2-9); standard 10 defines the range and complexity of what students need to read.

CCR Anchor Standards	Specific High School Demands in ELA, History/SS, Science, and Technical Subjects
1. Supporting claims with text evidence, including. . .	<ul style="list-style-type: none"> a. determining where the text leaves matters uncertain b. identifying key distinctions the author makes as well as any gaps or inconsistencies in the account
2. Determining central Ideas/themes, including. . .	<ul style="list-style-type: none"> a. how it emerges and is shaped and refined by specific details; provide an objective summary of the text b. providing an accurate, objective summary that makes clear the relationships among the details and ideas. c. paraphrasing information presented in scientific/technical texts
3. Analyzing individuals, events, and ideas and their relationships, including. . .	<ul style="list-style-type: none"> a. how an author’s choices develops and relates events, or ideas of texts b. various explanations for actions or events; determining which explanation best accords with textual evidence c. following precisely a complex multistep procedure
4. Interpreting meanings of words and phrases, including. . .	<ul style="list-style-type: none"> a. how an author uses and refines the meaning of a key term over the course of a text b. the impact of specific word choices on meaning and tone
5. Analyzing text structures and coherence, including. . .	<ul style="list-style-type: none"> a. how an author advances his or her exposition or argument, including how the points are made clear and convincing b. how key sentences and paragraphs of a text contribute to the whole c. how information or ideas are organized to advance or support ideas or create certain effects
6. Assessing point of view and purpose, including. . .	<ul style="list-style-type: none"> a. those reflected in a work of literature from outside the United States b. distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony) c. how authors respond to conflicting evidence or viewpoints d. how authors use rhetoric to advance that point of view or purpose e. how authors’ differing points of view on the same historical or scientific event or issue are a result of authors’ claims, reasoning, and evidence f. how style and content contribute to the power, persuasiveness, or beauty of a text
7. Integrating and evaluating content	<ul style="list-style-type: none"> a. determining which details are emphasized in each account (and why) b. multiple interpretations of a literary text (Include at least one play by Shakespeare and one play by an American

presented in diverse ways, including. . .	dramatist) c. information presented visually, quantitatively, as well as in words in order to address a question or solve a problem
8. Evaluating reasoning and evidence of authors' arguments, including. . .	a. identifying false statements and fallacious reasoning b. what is emphasized or absent in each treatment c. the reasoning in seminal U.S. texts and the premises, purposes, and arguments in works of public advocacy d. corroborating or challenging an author's hypothesis, premises, claims, and evidence with other sources of information
9. Analyzing relationships in two or more texts, including. . .	a. how an author draws on and transforms source material in a specific work b. how texts from the same period of American Literature (18 th , 19 th , and early 20 th century) treat similar themes or topics c. the themes, purposes, and rhetorical features of 17 th , 18 th and 19 th century foundational U.S. documents of historical and literary significance d. integrating information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event e. noting discrepancies among sources or resolving conflicting information
10. Comprehending complex literary and informational texts independently and proficiently	

Digest of High School College and Career Ready Writing Demands

To be college- and career- ready writers, the standards ask students to take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They cultivate the development of three mutually reinforcing writing capacities: writing arguments, writing to inform and explain, and writing to convey real or imagined experience. Consistent with NAEP, the overwhelming focus of writing throughout high school is on arguments and informative/explanatory texts. Writing Standard 9 is a standout because it stresses the importance of the writing-reading connection by requiring students to draw upon and write about evidence from literary and informational texts as they write arguments or to inform/explain. Because of the centrality of writing to most forms of inquiry, research standards are prominently included in this strand.

CCR Anchor Standards	Specific High School Demands in ELA, History/SS, Science, and Technical Subjects
1. Writing arguments to support claims that. . .	a. create an organization that logically sequences claim(s), counterclaims, reasons, and evidence b. supply the most relevant evidence for each claim c. clarify relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counter claims d. establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing
2. Writing informative/explanatory texts that. . .	a. organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole b. develop the topic thoroughly by selecting the most significant and relevant facts or other information

	<ul style="list-style-type: none"> c. clarify the relationships among complex ideas and concepts d. establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing
3. Writing narratives about real or imagined experiences or events that. . .	<ul style="list-style-type: none"> a. engage and orient the reader by setting out a problem, situation, or observation and its significance b. use a variety of techniques to sequence events so that they build on one another to create a coherent whole c. use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters
4. Producing clear and coherent writing that. . .	<ul style="list-style-type: none"> a. is appropriate to task, purpose, and audience as defined in writing standards 1-3
5. Developing and strengthening writing as needed by. . .	<ul style="list-style-type: none"> a. focusing on addressing what is most significant for a specific purpose and audience. b. editing for conventions as defined by Language standards 1-3
6. Using technology, including the Internet, to produce and publish writing, including. . .	<ul style="list-style-type: none"> a. producing, publishing and updating writing products b. displaying information flexibly and dynamically c. updating individual or shared writing products in response to ongoing feedback, including new arguments or information
7. Conducting short (as well as more sustained) research projects, including. .	<ul style="list-style-type: none"> a. narrowing or broadening the inquiry as appropriate b. synthesizing multiple sources
8. Gathering relevant information, including. . .	<ul style="list-style-type: none"> a. assessing the strengths and limitations of each source in terms of task, purpose, and audience b. integrating that information into the text to maintain the flow of ideas (avoiding any overreliance on any one source) c. avoiding plagiarism and following a standard format for citation
9. Drawing evidence from literary or informational texts to support analysis, reflection, and research.	
10. Writing routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences	

Digest of High School College and Career Ready Speaking and Listening Demands

Including but not limited to skills necessary for formal presentations, the Speaking and Listening standards require students to develop a range of broadly useful oral communication and interpersonal skills. The standards ask students to learn to work together, express and listen carefully to ideas, integrate information from oral, visual, quantitative, and media sources, evaluate what they hear, use media and visual displays strategically to help achieve communicative purposes, and adapt speech to context and task.

CCR Anchor Standards	Specific High School Demands in ELA
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1. Participating effectively in a range of conversations and collaborations, including. . .	a. coming to discussions prepared to share evidence from texts and other research b. promoting civil, democratic discussions and decision-making c. probing reasoning and evidence; challenging ideas and conclusions d. ensuring a hearing for a full range of positions e. synthesizing comments and determining what additional information is required to complete the task
2. Integrating and evaluating information presented in diverse media and formats, including. . .	a. evaluating the credibility and accuracy of each source b. noting any discrepancies among data
3. Evaluating a speaker’s point of view and reasoning, including. . .	a. identifying any fallacious reasoning or exaggerated or distorted evidence b. assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used
4. Presenting orally information and supporting evidence that. . .	a. conveys a clear and distinct perspective, such that listeners can follow the line of reasoning b. addresses alternative or opposing perspectives c. is appropriate to purpose, audience, and a range of formal and informal tasks
5. Making strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	
6. Adapting speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate	

Digest of High School College and Career Ready Language Demands
(Conventions, effective use, and vocabulary)

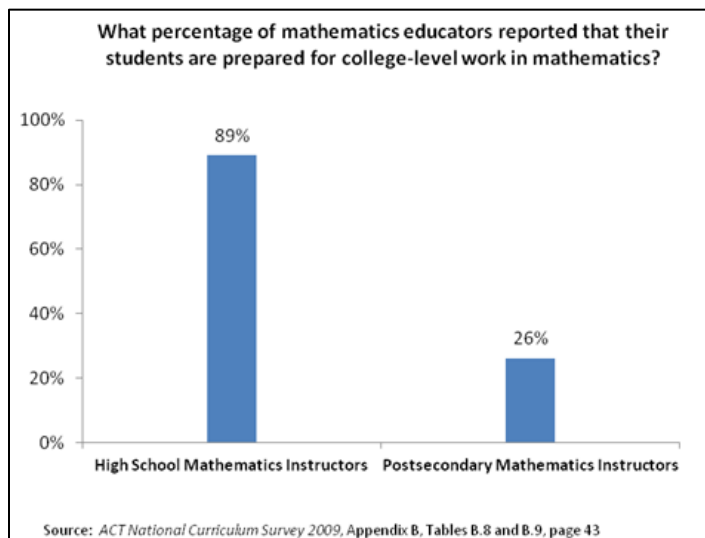
The Language standards include the essential “rules” of standard written and spoken English, but they also approach language as a matter of craft and informed choice among alternatives. The vocabulary standards focus on understanding words and phrases, their relationships, and their nuances and on acquiring new vocabulary, particularly general academic and domain-specific words and phrases.

CCR Anchor Standards
1. Demonstrating command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrating command of the conventions of standard English capitalization, punctuation, and spelling when writing.
3. Applying knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
4. Determining or clarifying the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrating understanding of figurative language, word relationships, and nuances in word meanings

6. Acquiring and using accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrating independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

CCSS Math Digest

Too many students today graduate from high school only to find themselves unprepared for college-level work in mathematics. High school teachers and postsecondary instructors also differ in their perceptions about student preparedness (see figure). The Common Core State Standards were developed to raise achievement and bridge this disconnect between K-12 and higher education.



The Standards were developed through a bipartisan, state-led initiative spearheaded by state superintendents and governors. The Standards reflect the collective expertise of hundreds of teachers, mathematicians, education researchers, and other leading experts from across the country. The Standards build on the best of previous state standards plus a large body of evidence from international comparisons and domestic reports and recommendations to define a sturdy staircase to college and career readiness (see the bibliography to the Standards on pp. 91-93).

In mathematics, the Standards include the following key shifts:

Focus

TIMSS and other international studies have concluded that mathematics education in the United States has been a mile wide and an inch deep. By contrast, we know that in higher-performing countries, strong foundations are laid and then further knowledge is built on them. Drawing on these lessons from international comparisons, the Standards focus strongly on arithmetic in early grades, along with the components of measurement that support it. That includes the concepts underlying arithmetic, the skills of arithmetic computation, and the ability to use arithmetic in applications. The strong focus on arithmetic in grades K–5 is designed to ensure that more students master the fundamentals leading to algebra. That includes procedural skill and fluency as well as the kind of operational thinking that becomes algebraic thinking in middle school.

Focus remains important through the middle and high school grades in order to prepare students for college and careers. National surveys have shown repeatedly (ACT 2006, 2009) that postsecondary instructors value greater mastery of prerequisites over shallow exposure to a wide array of topics.

Coherence

Coherence is about making math make sense. Mathematics is not a list of disconnected tricks or mnemonics. It is an elegant subject in which powerful knowledge results from reasoning with a small number of principles such as place value and properties of operations. The standards define progressions of learning that leverage these principles as they build knowledge over the grades.

Rigor

The Standards set rigorous expectations for:

- conceptual understanding
- procedural skill and fluency, and
- applications.

Each of the three aspects of rigor is important to raise achievement and prepare students for postsecondary work. The word “understand” is used in the Standards to set explicit expectations for conceptual understanding, the word “fluently” is used to set explicit expectations for fluency, and the phrase “real-world problems” and the star symbol (★) to set expectations and flag opportunities for applications.

Overview of the Standards

Standards for Mathematical Practice

The Common Core State Standards include expectations for mathematical content as well as mathematical practice. The Standards for Mathematical Practice enumerate habits of mind that characterize mature work in mathematics. Recent survey research (Conley, 2011) finds that postsecondary instructors from a wide range of subjects see these habits of mind as valuable for students to have.

Standards for Mathematical Practice (K–8 and High School)

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

For additional information, see pp. 6–8 of the Common Core State Standards for Mathematics.

Standards for Mathematical Content

Grades K–8. The content standards for grades K–8 set higher expectations than have been typical in previous state standards. Some key takeaways are shown in the table below. For the full statements of the expectations, see pp. 9–56 of the Common Core State Standards.

Key Takeaways in Grades K–8

Numerical Work

- Fluency in arithmetic
- Operations with rational numbers
- Absolute value and ordering of rational numbers
- Problem solving with positive and negative whole numbers, fractions, and decimals
- Approximating irrational numbers and estimating the value of expressions (e.g., $\sqrt{2}$)

Ratios and Proportional Relationships

- Solving problems involving proportional relationships
- Representing proportional relationships using graphs and equations

Algebra

- Using properties of operations to generate equivalent expressions
- Working with radicals and integer exponents
- Analyzing and solving linear equations
- Analyzing and solving pairs of simultaneous linear equations

Functions

- Defining, evaluating, and comparing functions
- Using linear functions to model relationships between quantities

Geometry

- Solving real-world and mathematical problems involving perimeter, area, surface area, volume, and angle measure
- Drawing, constructing, and describing geometrical figures
- Understanding and applying the Pythagorean Theorem
- Finding distances in coordinate systems

Statistics and Probability

- Develop understanding of statistical variability; summarize and describe distributions
- Understand concepts of probability and use simple probability models
- Use random sampling to draw inferences
- Investigate patterns of association in bivariate data

High School. The high school standards specify the mathematics that all students should study in order to be college and career ready.

Additional mathematics that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by (+). All standards without a (+) symbol

should be in the common mathematics curriculum for all college and career ready students. Standards with a (+) symbol may also appear in courses intended for all students.

The high school standards are listed in conceptual categories:

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

Conceptual categories portray a coherent view of high school mathematics; a students' work with functions, for example, crosses a number of traditional course boundaries, potentially up through and including calculus.

Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (*). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to all standards in that group.

The remaining pages of this digest reproduce the overviews of each conceptual category in the high school standards. For the text of the specific expectations in each category, see pp. 57–83 of the Common Core State Standards for Mathematics.

Number and Quantity Overview

The real Number System

- Extend the properties of exponents to rational exponents.
- Use properties of rational and irrational numbers

Quantities

- Reason quantitatively and use units to solve problems

The Complex Number System

- Perform arithmetic operations with complex numbers
- Represent complex numbers and their operations on the complex plane
- Use Complex number sin polynomial identities and equations

Vector and Matrix Quantities

- Represent and model with vector quantities
- Perform operations on vectors
- Perform operations on matrices and use matrices in applications.

Algebra Overview

Seeing structure in Expressions

- Interpret the structure of expressions
- Write expressions in equivalent forms to solve problems

Arithmetic with Polynomials and Rational Expressions

- Perform arithmetic operations on polynomials
- Understand the relationship between zeros and factors of polynomials
- Use polynomial identities to solve problems
- Rewrite rational expressions

Creating Equations

- Create equations that describe numbers of relationships

Reasoning with Equations and Inequalities

- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable
- Solve systems of equations
- Represent and solve equations and inequalities

Functions Overview

Interpreting Functions

- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations

Building Functions

- Build a function that models a relationship between two quantities
- Build new functions from existing functions

Linear, Quadratic, and Exponential Models

- Construct and compare linear quadratic, and exponential models and solve problems
- Interpret expressions for functions in terms of the situation they model

Trigonometric Functions

- Extend the domain of trigonometric functions using the unit circle
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities

Geometry Overview

Congruence

- Experiment with transformations in the plane
- Understand congruence in terms of rigid motions
- Prove geometric theorems
- Make geometric constructions

Similarity, Right Triangles, and Trigonometry

- Understand similarity in terms of similarity transformations
- Prove theorems involving similarity
- Define trigonometric ratios and solve problems involving right triangles
- Apply trigonometry to general triangles

Circles

- Understand and apply theorems about circles
- Find arc lengths and areas of sectors of circles

Expressing Geometric Properties with Equations

- Translate between the geometric description and the equation for a conic section
- Use coordinates to prove simple geometric theorems algebraically

Geometric Measurement and Dimension

- Explain volume formulas and use them to solve problems
- Visualize relationships between two-dimensional and three-dimensional objects

Modeling with Geometry

- Apply geometric concepts in modeling situations

Statistics and Probability Overview

Interpreting Categorical and Quantitative Data

- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Interpret linear models

Making Inferences and Justifying Conclusions

- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from sample surveys, experiments and observational studies

Conditional Probability and the Rules of Probability

- Understand independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of compound events in a uniform probability model

Using Probability to Make Decisions

- Calculate expected values and use them to solve problems
- Use probability to evaluate outcomes of decisions